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Sir:

Submitted herewith is a certified copy of Application No. 2,450,588 filed on November 25, 2003 in Canada the priority of which is claimed in the present application under the provisions of 35 U.S.C. 119.

Respectfully submitted,

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This is to certify that the documents attached hereto and identified below are true copies of the documents on file in the Patent Office.

Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,450,588,** on November 25, 2003, by **ALEXANDER D. KANARIS,** for "Motorized Drum Roller with Stationary Ends"

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Date

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ABSTRACT

A motorized conveyor roller having a rotatable portion and at least one stationary end.

Description

MOTORIZED DRUM ROLLER WITH FIXED ENDS

Field of Invention

This invention relates to motorized conveyor rollers and particularly relates to a motorized conveyor roller having a rotatable portion disposed between two opposite stationary ends. The invention also relates to the method of barring access to a motorized rotatable conveyor roller for driving a conveyor medium by disposing the motorized rotatable conveyor rollers between opposed generally cylindrical stationary ends.

Background Art

A variety of conveyor roller systems have heretofore been designed and utilized. A large variety of known conveyor roller systems comprise a continuous belt or conveyor medium which travels over a series of rollers. The rollers can be simple shafts on which may be mounted various forms of sprockets or drive means for supporting the conveyor medium. Some advanced conveyor systems utilize enclosed and sealed drive rollers with the drive motors contained inside the rollers themselves.

An example of such motorized conveyor roller is disclosed in U.S. Patent No. 5,088,596 which teaches a motorized conveyor roller mounted in a conveyer frame to support and propel articles from one end of the conveyor path towards the opposite end. The conveyer roller includes a roller tube rotatably mounted in the conveyor frame and drive means contained inside the roller tube for driving the roller tube. The drive means includes a motor, a gear reducer assembly operatively connected to the motor, and a drive member connected to the outward shaft of the speed reducer for engaging and rotating the roller tube.

Furthermore there has been a concern by some to improve the safety features of conveyor rollers and particularly motorized conveyor rollers. For

example, U.S. Patent No. 5, 642,799 illustrates a brake device for a conveyor having two load supporting conveyor rollers rotatable to engage a load thereon to be transported along the conveyor. The load supporting rollers are movably transversely to their axis of rotation by a load passing there over against a resilient bias into engagement with a brake roller adapted to brake rotation of the conveyor rollers.

Moreover U.S. Patent No. 5,143,184 illustrates a safety shutdown system for luggage conveyor systems.

Furthermore U.S. Patent No. 6, 082,528 teaches a conveyor roller.

There is, however, a need to improve the safety features of motorized conveyor rollers.

It is a further object of this invention to provide an improved motorized conveyor roller and method thereof.

It is an aspect of this invention to provide a motorized conveyor roller having a rotatable portion and at least one stationary end.

Disclosure of Invention

It is a further aspect of this invention to provide a motorized conveyor roller for supporting and driving a conveyor medium comprising a hollow drum defining a rotatable supporting surface having a cylindrical shape disposed between said first and second generally cylindrical stationary ends; said first and second generally cylindrical stationary ends co-axially mounted to first and second spaced apart stationary shafts respectively; one end of each of said stationary shafts disposed internally of said hollow drum for carrying drive means for rotating said hollow drum between said generally cylindrical stationary ends.

It is yet a further aspect of this invention to provide a method of barring access to a motorized rotatable conveyor roller for driving a conveyor medium by

disposing said motorized rotatable conveyor roller between opposed generally cylindrical stationary ends.

These and other objects and features of the invention shall now be described in relation to the following drawings.

Brief Description of Drawings

Fig. **1** is a full cross-sectional view of a motorized conveyor roller.

Fig. **2** is an end view of Fig. 1.

Best Mode for Carrying Out the Invention

In the description, which follows, like parts are marked throughout the specification and the drawings with the same respective reference numerals. The drawings are not necessarily to scale and in some instances proportions may have been exaggerated in order to more clearly depict certain features of the invention.

Fig. 1 generally illustrates the motorized conveyor roller **60** having a rotatable portion **1**. The rotatable portion **1** comprises a hollow drum or shell **1** disposed between a first generally cylindrical stationary end **54** and a second generally cylindrical stationary end **55**. The first and second cylindrical stationary ends **54** and **55** define two opposite stationary ends **54** and **55**.

The rotatable portion **1** comprises a rotatable displaceable roller tube as shown. The roller tube **1** includes a motor generally depicted as **62.** The motor comprises a stator **13** and rotor **14**. The rotor **14** defines a rotatable shaft **63** which is received by ball bearings **37** and **37A** for rotation thereabouts.

More specifically each of the stationary ends **54** and **55** are co-axially disposed about a first stationary shaft **64** and a second stationary shaft **65** as shown in Fig. 1. First and second stationary shafts **64** and **65** are co-axially

disposed with rotatable shaft **63** about an axis X. First stationary shaft **64**, second stationary shaft **65** and rotatable shaft **63** define a central axis X.

In other words the first and second spaced stationary shafts **64** and **65** carry the two stationary ends **54** and **55** respectively. Each of the stationary ends present a generally cylindrical surface **74** and **75** presenting an outer diameter D_1, D_2 respectively. Furthermore each of the first and second stationary ends **54** and **55** are secured to the stationary shafts **64** and **65** by a variety of means including socket headset screws **58** located in set screw holes **76** and **78** as shown. Alternate securing means can be used to secure the first and second stationary ends **54** and **55** to the stationary shafts **64** and **65** such as keyways, friction fit splines, adhesive and the like.

Furthermore the rotatable shaft **63** is carried by the motor **62**.

The hollow drum **1** defines a rotatable supporting surface having the cylindrical shape as shown disposed between the first and second generally cylindrical stationary ends **54** and **55**. One end **80** and **81** of each of the stationary shafts **64** and **65** respectively are disposed internally of the hollow drum **1** for carrying the drive means which consists of the motor **62** for rotating the hollow drum **1** between the generally cylindrical stationary ends **54** and **55**.

More specifically the second shaft **65** comprises a hollow shaft **7** having a cable passage **16** for receiving an electrical cable electrically connected to the motor **62** as shown. One end of the hollow drum **1** includes an end flange **2A** while the other end of the hollow drum **1** includes end flange **2B**. Both end flanges **2A** and **2B** are press fit or connected to the outer shell of the hollow drum **1**.

End flange **2A** includes a double seal adapter **45DS** and oil seal **46** as well as bearing rings **45**. Furthermore ball bearings **36** are also associated with end flange **2A**.

Moreover end flange **2B** includes ball bearings **36**, a mounting ring **5** and spring ring **19**. A filler plug **34** and washer **35** are also disclosed. A socket head cap screw **31** is utilized to secure the end flange **2B** to the mounting ring **5** and spring ring **19** together. Furthermore bearing race **45** and oil seal **46** with bearings **56** are shown.

The other ends **90** and **91** of stationary shafts **64** and **65** have a cross-section which permits the other ends **90** and **91** of the first and second stationary shafts **64** and **65** to be held by a shaft holder on the like that will register with the square cross-section for positive securement. In Fig. 2 the other end **90** and **91** presents a generally square cross-section so as to prevent rotation of the stationary shafts **64** and **65**. The other end **91** of second stationary shaft **65** illustrates a PG9 connector **53**.

Moreover one end **80** of fixed shaft **64** presents a gear housing **3**. One end **81** of the second shaft **65** presents a motor flange **4**. Furthermore locking disk **41** is disposed in the vicinity of the motor flange **4**. Each of the gear housing **3** and motor flange **4** present ball bearings **37A** and **37B** respectively which permit free rotation of the rotor or rotational shaft **14**. The ends of gear housing **3** and motor flange **4** present securing means **17** to secure the stator **13** thereto as shown. More specifically the securing means **17** comprises in one example socket head cap screws as shown.

The rotatable shaft **63** which defines the rotor **14** has at one end thereof a pinion **93** for rotational engagement with gear **11**. Gear **11** is press fit to second pinion **9** which rotationally engages internal gear **8**. The internal gear **8** is presented by end flange **2A** thereby causing the hollow shell **1** to rotate about the stator **13**. The assembly further includes a distance ring **12** as shown. Moreover snap ring **44**, ball bearings **38** and snap ring **43** are shown.

The outer surface **95** of hollow drum **1** presents an outer diameter D_3 which is slightly greater than the diameter of each of the generally cylindrical stationary ends D_1 and D_2. Therefore a conveyor medium (not shown) will be driven by the outer surface **95** of the rotatable portion **1** rather than the outer

surface **74** and **75** of first and second stationary ends **54** and **55**, since outer surface **95** is slightly raised. Furthermore the outer surface **95** can include any variety of means to increase the co-efficient of friction between the outer surface **95** and the conveyor medium such as for example by knurling or machining a spiral at each end toward the center or by covering the outer surface **95** with rubber.

Furthermore the gear **11**, second pinion **9** and internal gear **8** define gear means which is driven by the first pinion **93**.

The invention described herein defines a method of barring access to a motorized rotatable conveyor roller **1** which drives a conveyor medium by disposing the motorized rotatable conveyor roller **1** between opposed generally cylindrical stationary ends **54** and **55**.

Accordingly if someone near the conveyor system accidentally touches the end of the motorized conveyor roller **60**, they will come into contact with the stationary ends **54** and **55** thereby preventing any damage which may otherwise occur where a person would come in contact with rotating parts which may cause physical damage or catch any loose clothing drawing a person into the system.

Furthermore the invention described herein can be utilized to retrofit existing motorized conveyor rollers having one end **90** and **91** of first and second stationary shafts **64** and **65** which are long enough to accommodate the addition of a stationary ends **54** and **55** thereto. In other words, stationary ends **54** and **55** may comprise of adapters which are sufficiently sized so as to enable one to attach the first and second stationary ends to the shafts **64** and **65** by utilizing securing means **58** as shown.

Moreover although the stationary ends **54** and **55** are shown as secured to the first and second stationary shafts **64** and **65** it is possible to include appropriate grooves within the shafts **64** and **65** to receive C-washers that would retain the stationary ends there between.

Typically there is a small gap between the ends of the first and second stationary ends **54** and **55** and end flange **2A** and end flange **2B**. For example, such gap may be in the vicinity of 0.04 inch although such example should not be interpreted as limiting but only as an example.

The invention described herein illustrates a rotatable roller having cylindrical ends disengaged from the rotational movement of the rotational roller.

Various embodiments of the invention have now been described in detail. Since changes in and/or additions to the above-described best mode may be made without departing from the nature, spirit or scope of the invention, the invention is not to be limited to said details.

Claims

I claim:

1. A motorized conveyor roller having a rotatable portion and at least one stationary end.

2. A motorized conveyor roller as claimed in claim 1 wherein said rotatable portion is disposed intermediate to opposite stationary ends.

3. A motorized conveyor roller as claimed in claim 2 wherein said rotatable portion comprises a rotatable displaceable roller tube.

4. A motorized conveyor roller as claimed in claim 3 wherein said roller tube includes a motor for rotating said roller tube.

5. A motorized conveyor roller as claimed in claim 4 wherein each said stationary end is axially disposed about a central shaft.

6. A motorized conveyor roller as claimed in claim 5 wherein said central shaft comprises a rotatable shaft portion disposed between said first and second spaced stationary shafts.

7. A motorized conveyor roller as claimed in claim 6 wherein said first and second stationary shafts carry said two stationary ends respectively.

8. A motorized conveyor roller as claimed in claim 7 wherein said rotatable shaft portion is carried by said motor.

9. A motorized conveyor roller as claimed in claim 8 wherein one end of said rotatable shaft portion presents a pinion for driving said rotatable roller tube.

10. A motorized conveyor roller as claimed in claim 9 wherein each of said stationary ends comprise a generally cylindrical surface presenting an outer diameter less than the outer diameter of said rotatable roller tube.

11. A motorized conveyor roller as claimed in claim 10 wherein said outer diameter of said rotatable roller tube is adapted to drive a conveyor belt.

12. A conveyor system as claimed in claim 11 wherein said stationary ends bar access to said rotatable roller tube when said stationary ends are accidentally contacted.

13. A motorized conveyor roller for supporting and driving a conveyor medium comprising:

(a) a hollow drum defining a rotatable supporting surface having a cylindrical shape disposed between said first and second generally cylindrical stationary ends;

(b) said first and second generally cylindrical stationary ends co-axially mounted to first and second spaced apart stationary shafts respectively;

(c) one end of each of said stationary shafts disposed internally of said hollow drum for carrying drive means for rotating said hollow drum between said generally cylindrical stationary ends.

14. A motorized conveyor roller as claimed in claim 13 wherein said outer surface of said hollow drum presents an outer diameter greater than the outer diameter of each of said generally cylindrical stationary ends.

15. A motorized conveyor roller as claimed in claim 14 wherein said outer surface of said hollow drum includes means for increasing the co-efficient of friction between said outer surface of said hollow drum and said conveyor medium.

16. A motorized conveyor roller as claimed in claim 15 wherein said motor presents a rotating shaft co-axially disposed between said stationary shafts.

17. A motorized conveyor roller as claimed in claim 16 wherein one end of said rotating shaft includes a pinion for driving gear means.

18. A motorized conveyor roller as claimed in claim 17 wherein one end of one of said stationary shafts further includes an internal gear connected to said hollow drum and engageable with said gear means for rotating said hollow drum.

19. A motorized conveyor roller as claimed in claim 18 wherein said stationary ends are secured to said stationary shafts.

20. A method of barring axis to a motorized rotatable conveyor roller for driving a conveyor medium by disposing said motorized rotatable conveyor roller between opposed generally cylindrical stationary ends.

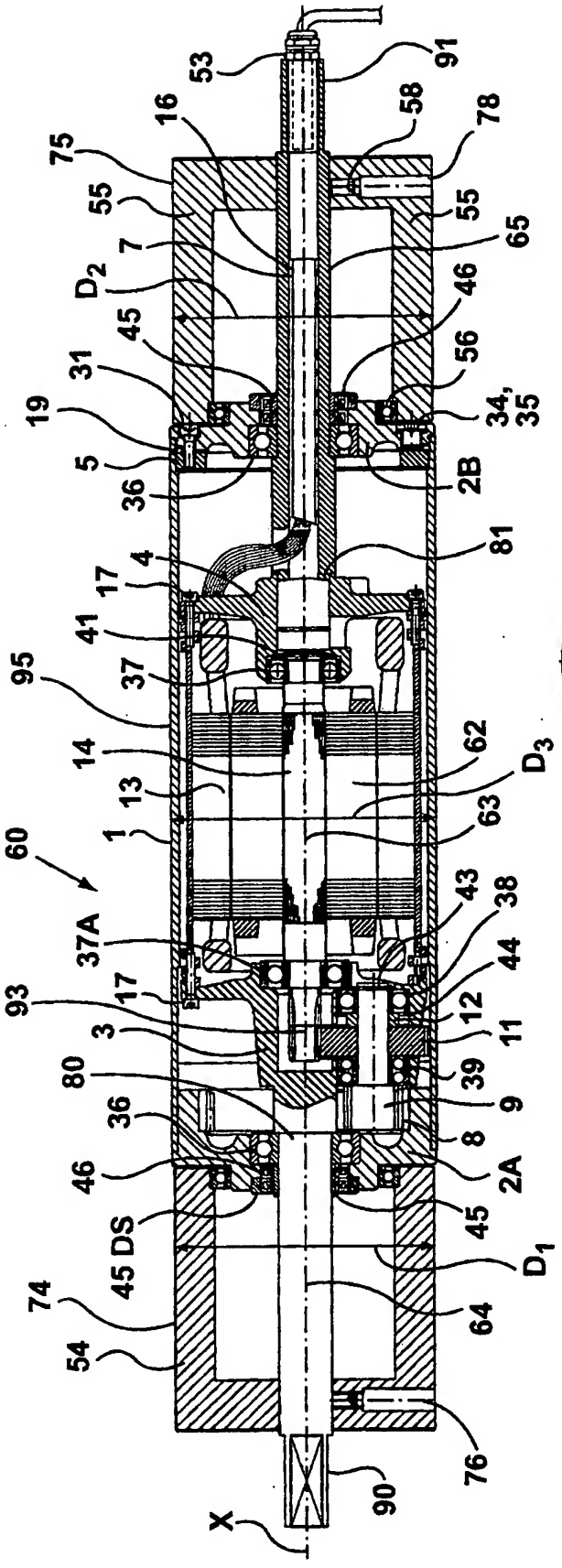
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FIG. 1

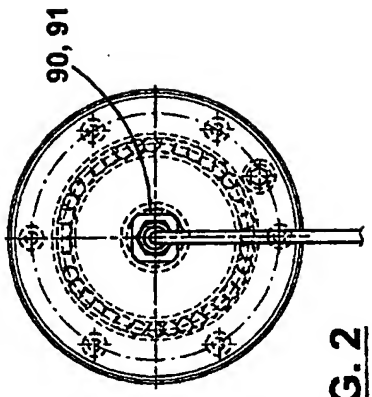
90, 91

FIG. 2